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Does a Booster Intervention Augment the Preventive Effects of an Abbreviated Version of the Coping Power Program for Aggressive Children?

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Abstract

Booster interventions have been presumed to be important methods for maintaining the effects of evidence-based programs for children with behavioral problems, but there has been remarkably little empirical attention to this assumption. The present study examines the effect of a child-oriented booster preventive intervention with children who had previously received an abbreviated version (24 child sessions, 10 parent sessions) of the Coping Power targeted prevention program. Two hundred and forty-one children (152 boys, 89 girls) were screened as having moderate to high levels of aggressive behavior in 4th grade, then half were randomly assigned to receive the abbreviated Coping Power program in 5th grade, and half of the preventive intervention children were then randomly assigned to a Booster condition in 6th grade. The Booster sessions consisted of brief monthly individual contacts, and were primarily with the children. Five assessments across four years were collected from teachers, providing a three-year follow-up for all children who participated in the project. Results indicated that the abbreviated Coping Power program (one-third shorter than the full intervention) had long-term effects in reducing children's externalizing problem behaviors, proactive and reactive aggression, impulsivity traits and callous-unemotional traits. The Booster intervention did not augment these prevention effects. These findings indicate that a briefer and more readily disseminated form of an evidence-based targeted preventive intervention was effective. The findings have potential implications for policy and guidelines about possible intervention length and booster interventions.

There have been substantial gains in knowledge of evidence-based prevention programs to reduce children's levels of aggressive and externalizing behavior and to reduce their risk for later antisocial outcomes (Forman, Olin, Hoagwood, Crowe, & Saka, 2009). However, there is scant data to indicate whether these prevention effects are maintained over longer term follow-ups, whether these interventions can have an impact on stable personality features of these youth, and whether these preventive intervention effects can be further enhanced with booster interventions.

Longer-term Follow-Up Effects of Targeted Prevention Programs

There are relatively few studies of longer term effects of evidence based prevention programs for aggressive, at-risk children and preadolescents, once the preventive

intervention has been completed. Because of the ethical and clinical difficulties in following untreated control groups into follow-up periods in treatment studies, only a few treatment programs have reported effects on children with aggressive behavior at short-term follow-ups in uncontrolled (Beauchaine, Webster-Stratton, & Reid, 2005) and rigorously controlled (Kazdin, Siegel & Bass, 1992) treatment studies. Zonnevylle-Bender, Matthys, van de Wiel and Lochman (2007) found that an adapted Dutch version of the Coping Power program had reductions in substance use, but not aggressive behavior, in comparison to a care-as-usual treatment intervention at a four-year follow-up with children diagnosed as having Conduct Disorder or Oppositional Defiant Disorder. Because prevention studies often do incorporate untreated control groups, as control families had not sought the preventive intervention, follow-up studies of prevention programs are especially important in demonstrating the effect of the intervention in comparison to the typical trajectory for these children.

A series of studies have found longer-term effects of universal prevention programs, delivered to all children within a population, including reductions in adolescent substance use six years after intervention (Spoth, Redmond, Shin, & Azevedo, 2004) and in youth arrests two and a half years after the end of the LIFT program (Eddy, Reid, Stoolmiller, & Fetrow, 2003). Incredible Years used as an universal intervention has produced preventive effects in short-term follow-ups (6 months; 1 year) on parent report of behavior and on observed behavior, but not on teacher report, for children in preschool Head Start and Sure Start programs (Hutchings et al., 2007; Webster-Stratton, 1998). Effects on teacher reports of aggression and conduct problems have been found in multi-year follow-ups for several universal prevention programs delivered in the early elementary school years, the Good Behavior Game (Ialongo, Werthamer, Kellam, Brown, Wang, & Lin, 1999) and the PATHS program (Greenberg & Kusche, 2006). In a study of a long-term (10 year) comprehensive intervention that included universal and indicated prevention elements, The Fast Track program has found reductions in the occurrence of arrests (Conduct Problem Prevention Research Program, under review-a) and of externalizing diagnoses (Conduct Problem Prevention Research Program, under review-b) in the first several years following the program.

However, few controlled studies exist of longer-term follow-ups of more focused indicated prevention programs targeted only at high risk children. The Montreal Delinquency Prevention Program produced effects on self-reported delinquency at age 12, following an intervention with at-risk children in grades 2–3 (Vitaro, Brendgen, & Tremblay, 2001). Lochman (1992) found that aggressive boys had lower rates of self-reported substance use three years after involvement in the Anger Coping program. Although these latter findings from controlled trials are encouraging, the only long-term follow-up study of focused targeted prevention programs with an “unbiased” measure such as school records and blinded teacher ratings found that Coping Power children had lower teacher-rated aggression and academic problems (Lochman, Wells, Qu & Chen, in press), and less deterioration in language arts grades (Lochman, Boxmeyer, Powell, Qu, Wells & Windle, 2012) across time in comparison to a control condition in a three-year follow-up.

Long-term Effects on Adolescent Functioning Associated with Serious Antisocial Behavior

Preventive and treatment interventions have been effective in reducing children’s externalizing behaviors at the end of interventions (Eyberg, Nelson, & Boggs, 2008), and there are some promising indications that effects may be maintained into follow-up periods. Nevertheless, it is unclear if interventions can affect children’s enduring personality features (e.g. callous-unemotional traits) and behavioral patterns (e.g. proactive and reactive aggressive behavior) that are predictive of later antisocial behavior. Aggressive behaviors

can be separated between those that are more planful and goal-oriented (proactive aggression) versus those that are more of an affectively-charged impulsive reaction to an immediate provocation (reactive aggression) (Dodge, Lochman, Harnish, Bates, & Pettit, 1997). Although both proactive and reactive aggression have been found to be predictive of later substance use (Fite, Colder, Lochman, & Wells, 2008), only proactive aggression has been predictive of later delinquent behavior (Vitaro, Brendgen, & Barker, 2006). There has been limited intervention research on these subtypes of aggression, but the Coping Power prevention program has been found to have significant effects at post-intervention only on proactive aggression (Lochman & Wells, 2002b). It is unclear whether this form of intervention can have lasting effects on both of these forms of aggression.

There is ongoing debate about the degree to which psychopathy is treatable. Psychopathy and callous-unemotional traits have been found to have at least moderate stability across time (Barry, Barry, Deming & Lochman, 2008) and predict poor outcomes (Pardini & Fite, 2010). Some researchers maintain that treatment could worsen the condition or, at best, have no effect (Harris & Rice, 2006), while other researchers highlight promising evidence that psychopathic features (e.g. callous-unemotional traits) may indeed be amenable to treatment (Salekin, 2010). Even though they have certain limitations, several studies suggest that intervention may affect psychopathic features in preadolescent children. Although lacking randomized control groups, Hawes and Dadds (2007) and Kolko, Dorn, Bukstein, Pardini, Holden and Hart (2009) have found that parenting treatments reduce callous-unemotional traits in children referred for treatment. In a randomized control trial, McDonald, Dodson, Rosenfield and Jouriles (2011) found Project Support, a targeted preventive intervention delivered in domestic violence shelters, reduced psychopathic features in 4- to 9-year-old children relative to a services-as-usual comparison group. It is not clear, however, if targeted preventive interventions delivered in the preadolescent years can have an effect on children's callous-unemotional traits.

Booster Interventions

Despite the intuitive appeal of having booster sessions after the completion of a program (Eyberg, Edwards, Boggs & Foote, 1998), little research exists on the effects of booster interventions with aggressive children (Tolan, Gorman-Smith, Henry, & Schoeny, 2009). Booster sessions often are refresher meetings that occur after the formal intervention is over and are provided several weeks to several months apart. The booster sessions typically cover the main content of the formally conducted intervention. Based on cognitive behavioral theory, booster interventions are expected to operate cognitively to enhance retention and memory of intervention concepts, through review and repeated rehearsal of principal constructs and processes during discussion and problem-solving in sessions. Booster interventions can also operate behaviorally by providing social reinforcement for new, but still fragile, skills displayed by children and their parents. The latter could be an especially important role for booster interventions for children with externalizing behavior problems, as their behavioral difficulties are likely related to longstanding personal and contextual risk factors, many of which likely remain unchanged after intervention. One of the greatest difficulties with interventions for children with disruptive behavior problems is that the children's improved changes in behavior tend to erode over time. Following an intervention, children remain in the same peer and neighborhood settings which may have contributed to children's problems, gains may not be positively reinforced, and other key individuals, such as teachers, may still expect that the formerly aggressive child will behave in antisocial ways. Thus, the counselors' social reinforcement delivered during a booster intervention may play a pivotal role.

The limited research on booster interventions for child and adolescent problems has produced inconclusive findings about the value of booster interventions. A booster intervention that consisted of six sessions across two follow-up years has been found to be effective with depressed adolescents (Clark, Rohde, Lewinsohn, Hops, & Seeley, 1999), and an early experimental case study without randomized control conditions has suggested that two brief booster sessions provided to parents can enhance intervention effects on children's problem behaviors (e.g. McDonald & Budd, 1983). In targeted prevention research on the Anger Coping Program for at-risk children, Lochman (1992) found that earlier intervention-produced reductions in children's disruptive off-task behavior in school settings were maintained at a three-year follow-up only for aggressive children who had received a booster intervention. The booster intervention consisted of six additional child groups and five parent sessions in the school year following the preventive intervention. Tolan et al. (2009) had mixed findings that indicated that a lengthy family-oriented booster of over 20 sessions following a family-based preventive intervention produced further effects on some behavioral outcomes for high-risk children, although not on their aggressive behavior. Several other treatment and prevention studies with adults and children have not found any effects for booster interventions on aggressive or impulsive behavior. Booster sessions, consisting of six follow-up telephone calls, have not produced additional effects in a treatment for adults with impulse control problems (Hodgins, Currie, Currie, & Fick, 2009), nor for a child-focused six-session booster following a classroom social problem solving program designed to reduce aggression (Daunic, Smith, Brank, & Penfield, 2009). In general, the limited research indicates that booster interventions have not been systematically useful in reducing children's aggressive behavior, although inclusion of a parent-component in a targeted prevention program has had some positive effects on related behavioral problems. No research has been conducted on child-focused booster interventions for targeted prevention programs for at-risk aggressive children.

Coping Power

We examined the longer-term follow-ups, effects on psychopathic traits, and effects of booster interventions within the context of a randomized controlled trial of an abbreviated version of the Coping Power prevention program. Coping Power is a targeted prevention program for late-elementary students exhibiting aggressive behavior (Lochman, Boxmeyer, Powell, Barry, & Pardini, 2010). The child group component of the program is delivered in the school setting while the accompanying parent group component has been delivered in school or community center settings. The program targets empirical risk factors for conduct problems, delinquency, and substance abuse. A contextual social-cognitive model of risk for disruptive behavior problems (Lochman & Wells, 2002a) serves as the foundation for Coping Power, and indicates that children with disruptive behavior often arrive at school with a constellation of challenges, including poor emotional self-regulation, greater impulsivity, less developed cognitive skills, and poor social problem-solving. They also tend to have stressed parents with less skillful parenting behavior, come from socioeconomically disadvantaged neighborhoods, and attend schools with high-densities of similarly high-risk children.

The Coping Power program is one of the few evidence-based targeted intervention programs that have been developed to be delivered in the late preadolescent years. Using the full-length version of the program (34 child sessions, 16 parent sessions) in three samples different from the one examined in this study, the Coping Power program has produced reductions in teacher-rated aggression and externalizing problems at post-intervention (Lochman, Boxmeyer, Powell, Qu, Wells, & Windle, 2009; Lochman & Wells, 2002b;), one-year follow-ups (Lochman & Wells, 2003, 2004), and in a three-year follow-up (Lochman et al., in press). Coping Power has also produced preventive effects on

delinquency and substance use at one-year follow-ups (Lochman & Wells, 2003, 2004) and substance use at a four-year follow-up (Zonneville-Bender, Matthys, van de Wiel, & Lochman, 2007). Analyses exploring the active mechanisms in Coping Power have found that parenting processes, children's social cognitive processes, and their internal locus of control mediate intervention effects at a one-year follow-up (Lochman & Wells, 2002a).

Prior analyses of the sample used in the present study have found that an abbreviated version of Coping Power, with one-third sessions, produced improvements in teacher-rated externalizing problems at post-intervention at the end of fifth grade, in comparison to a randomized control group (Lochman, Boxmeyer, Powell, Roth & Windle, 2006). These intervention effects were most evident in dosage analyses when parents' attendance in the program was taken into account. This abbreviated version of Coping Power (24 child sessions; 10 parent sessions) was expected to be more efficient, could be delivered during one school year, and was responsive to parents and school staff who were concerned about implementation barriers related to the full length of the original program (34 child session; 16 parent sessions). The development of an abbreviated version of this evidence-based program has considerable public health value because evidence-based interventions for externalizing behavior problems can be perceived to be too lengthy by parents and by practitioners (e.g. Forman et al., 2009; Kazdin, Holland, & Crowley, 1997), and thus an abbreviated intervention may be more readily disseminated and widely used.

Current Study

The current study has three primary hypotheses. First, it is hypothesized that this abbreviated form of Coping Power will have long term effects three years after the end of intervention on teacher-rated externalizing behavior. These analyses will indicate whether an intervention that has previously been determined to be evidence-based can be adapted in significant ways, by reducing its length by one-third in this case, and still have significant long-term follow-up effects. Second, it is hypothesized that the intervention's long-term effects will also be apparent in children's traits related to psychopathy, including impulsive-conduct problem behaviors and callous-unemotional (CU) traits, and on proactive and reactive aggressive behavior. Third, and of most importance to this special section, we will examine whether a booster intervention, rarely studied, augments Coping Power intervention effects. The Coping Power booster intervention (CP-B) was designed to promote children's recall, and to reinforce children's use of skills (e.g. problem-solving; emotion awareness; anger management; perspective taking) learned during the abbreviated Coping Power program.

Method

Participants

Participants in this study included 241 children and their primary caregivers who were recruited for a randomized controlled trial of Coping Power (described below) in three annual cohorts. Eighty-five percent of the families contacted agreed to participate, resulting in the total sample of 241. The study included three conditions: 61 students received the abbreviated Coping Power program during 5th grade (CP); 60 students were offered abbreviated Coping Power during 5th grade as well as a Booster intervention (described below) during 6th grade (CP-B); and 120 students formed the care-as-usual control condition. The average child age was 10.7 (SD=.56, Range 9–12). The gender breakdown for the sample was 63% male and 37% female. According to sample self-reports, 68% were African-American, 31% Caucasian, and 1% "other race/ethnicity." Ninety percent of the primary caregivers included at least one of the children's birthparents. The family composition involving birthparents included the biological mother only (44%), both biological parents (31%), the biological mother and a stepfather (21%), the biological father

and a stepmother (3%), and the biological father only (2%). Of the 10% of children who were not living with a biological parent, the primary caregivers were grandparents, foster parents, or other relatives. The families' socioeconomic status (SES) was on average in the lower class, with a mean Hollingshead Index score of 28.0.

Procedure

Children's eligibility for participation in this study was determined by 4th grade teacher ratings of 6 items assessing overt proactive and reactive aggressive behavior (Dodge & Coie, 1987). Using a screening procedure typical for targeted preventive interventions (e.g. Lochman & Conduct Problems Prevention Research Group, 1995), students were eligible for the project if their aggression scores were in the top 30% for all children rated, thus clearly indicating to what degree participant children were at-risk relative to the population. Families of eligible students were invited to participate during the summer prior to the child's entry into 5th grade. In face-to-face interviews with parents and children, study procedures were explained, and informed consent and assent were obtained. Children were randomly assigned to Coping Power vs Control after baseline (T1) assessment in the summer after 4th grade, and intervention children were randomly assigned to receive Booster intervention (CP-B) or not (CP) at T2 in the summer after 5th grade. Children (and their parents) who were randomly assigned to the Booster were informed that the Booster could help children's continued good use of their Coping Power skills.

Data for this study were collected from participating students' teachers using paper questionnaires. Fifth grade teachers completed the measures twice, once in the Fall before the Coping Power intervention started, and again in the Spring, when Coping Power was complete. Each subsequent Spring through the students' 8th grade year, a current teacher for each participating student was asked to complete questionnaires, resulting in five data collection timepoints for teacher-reported data. Teachers received a small stipend for completing the questionnaires. The T1 assessment was at baseline (fall of 5th grade), T2 at post-intervention (spring of 5th grade), T3 at post-Booster (and at a 1 year follow-up for CP; spring of 6th grade), T4 at a 1 year follow-up for Booster and 2 year follow-up for CP (spring of 7th grade), and T5 at a 2 year follow-up for Booster and 3 year follow-up for CP (spring of 8th grade).

Intervention

Coping Power is a manualized cognitive behavioral intervention that includes a 34-session child component and a 16-session parent component in its most comprehensive form (Lochman et al., 2009). The current study tested the efficacy of an abbreviated version of Coping Power, in which all of the core content from the full program was delivered in 24 child group sessions and 10 parent group sessions during one school year (5th grade). Coping Power groups were led by two members of the research team, typically one doctoral-level and one master's-level staff member. Following each child and parent group meeting, leaders completed self-report measures of intervention integrity indicating the extent to which each manualized session objective had been covered (i.e., "completely," "partially," or "not at all"). Although it is optimal to measure intervention fidelity with both counselor and observer ratings (e.g. Lochman, et al., 2009; Mowbray, Holter, Teague, & Bybee, 2003), resources were not available for observer ratings of fidelity in this study; although imperfect, counselor data is useful when observer data is not realistically available. Problem-solving about group issues occurred at weekly supervision meetings.

Coping Power - Child Component—The child component of Coping Power is an enhanced and expanded version of the Anger Coping program (Larson & Lochman, 2010). The intervention was delivered in small groups of approximately 4–6 children at eight

participating elementary schools. Each session lasted approximately 50–60 minutes and followed a planned agenda, with specific intervention activities repeated at the beginning (goal setting, content and homework review) and end (homework assignment, positive feedback, prize box) of each session. New topics and skills were introduced and practiced in the middle of each session.

The specific skills taught in the Coping Power child intervention include: a) setting short-term and long-term personal behavior goals; b) attending to physiological cues of anger arousal; c) using distraction, deep breathing, and self-instruction to cope with anger arousal; d) learning to view problem situations from others' perspectives; e) learning to solve social problems more effectively by evaluating potential choices and consequences and practicing verbally-assertive solutions; and f) resisting peer pressure, and affiliating with positive peers. The child group sessions were also supplemented with brief monthly individual contacts (20–30 minutes each) to discuss program content. The children assigned to the intervention condition received nearly the full dose of the Coping Power Child Component, with an average child attendance rate of 87%.

Coping Power - Parent Component—In the current study, the parent component of Coping Power included 10 parent group sessions that were offered 1–2 times per month during the 5th grade year. Parent sessions were held at the child's school or a convenient community location and lasted 90 minutes each. Parent groups were facilitated by the child group leaders, who shared information about the children's progress. The agenda for Coping Power parent sessions included a social gathering time to foster supportive bonds between parents; discussion of content from child sessions; recall of skills from prior parent sessions; review of home practice activities; introduction and practice of new parenting skills; and assignment of new home practice activities. The skills taught in the parent intervention included helping parents: a) develop and maintain a positive relationship with their child; b) create a supportive and cohesive family environment; c) support their child's academic success; d) manage their own mood and the stress of parenting; e) give clear instructions; f) implement a consistent behavior management system; and g) teach their child to solve interpersonal problems more effectively.

To engage parents in the intervention, each parent/parent dyad was contacted prior to initiating the intervention to identify the most convenient meeting time and location, and an overview of the meeting dates and discussion topics was circulated to parents. Individual reminder contacts were made prior to each session. A supervised child waiting room, food, and refreshments were offered for each session. Attempts were also made to facilitate ride-sharing and to address other barriers to attending. Parents received a small stipend for attending each session (\$10). Parents attended an average of 3.7 sessions (SD=3.6, range 0 to 10 sessions). Typically only one parent from each family attended a session; both parents attended sessions less than 10% of the time.

Booster intervention—At the end of fifth grade, a subset of children in the intervention condition (N=60) were randomly selected to receive monthly booster intervention sessions during their first year of middle school (6th grade). The goal of the booster intervention (CP-B) was to reinforce children's use of skills (e.g. problem-solving; emotion awareness; anger management; perspective taking) learned during the Coping Power program. Intervention staff planned to meet with each child in the booster condition on a monthly basis, for about 20–30 minutes. With some exceptions, the staff member providing the booster intervention was one of the child's prior Coping Power group leaders. Leaders provided a mean of 7.3 booster sessions to children in the CP-B condition (SD=1.3, Range 5–10 sessions). Booster sessions with children lasted an average of 25 minutes (SD=8.4, range 10–90 minutes). While the majority of booster contacts included the child only (80%), some booster contacts

included other key individuals (parents were included 10% of the time, school guidance counselors 6%, teachers 5.5%, and school principals 1.7%). The child was sometimes present when other key individuals were involved. The most frequent topic/activity in the child booster sessions was a review of Coping Power information, which occurred in 54% of sessions. Discussion of school-related problems and concerns was the second most frequent topic (43% of booster sessions), followed by information-sharing (22%); discussion of peer group problems and concerns (19% of booster sessions); discussion of child-specific problems and concerns (17%); discussion of long-term goals (15%); completion of clerical forms (10%); discussion of family problems or concerns (10%); and discussion of short-term goals (10%).

Measures

As noted previously, children were screened into this sample using 4th grade teacher ratings of 6 items assessing overt proactive and reactive aggressive behavior (Dodge & Coie, 1987). Teacher screening of children's problem behaviors has been found to be a valid and reliable method for screening for later antisocial behavior (Hill, Lochman, Coie, Greenberg & Conduct Problems Prevention Research Group, 2004; Lochman et al., 1995). The total Screen score had excellent internal consistency for this sample ($\alpha = .85$).

Research assistants met with teacher teams at each school to identify teachers who had most exposure to each student and knew the child best. The teacher who knew the child best at each assessment time point completed the following three outcome measures.

Behavior Assessment System for Children – Teacher Rating Scale (BASC-TRS; Reynolds & Kamphaus, 1992)—The BASC-TRS is a comprehensive behavior checklist yielding standardized scores for children's problem and adaptive behaviors. Each item is rated on a scale of 0 to 3. The externalizing composite scale was used in the current study to assess for intervention effects on children's externalizing behavior problems. The externalizing composite scale is derived from scores on the hyperactivity (13 items), conduct problems (10 items), and aggressive behavior (14 items) subscales. The externalizing composite scale has a possible raw score range of 0–111, with higher scores reflecting more severe externalizing behavior. In the current sample, the externalizing composite scale had strong internal consistency, with Cronbach's alpha levels ranging from .96 to .97. Intervention effects were assessed by examining changes in teacher-rated externalizing behavior problems from pre-intervention through the 3 year follow-up.

Teacher Report of Reactive and Proactive Aggression—This 22-item measure asks teachers to rate the child on a scale ranging from 1 (“never true”) to 5 (“almost always true”) (Kempes, Matthys, Maassen, van Goozen, & van Engeland, 2006). Items load on either a proactive aggression or a reactive aggression scale. Internal consistency was excellent for across the five assessment points for the proactive (.96, .96, .96, .97, .96, for T1 to T5 respectively) and reactive (.92, .92, .93, .94, .93) aggression scales in the present sample. Both the proactive aggression and reactive aggression scales were the sum of 11 items (range of 11 to 55).

Antisocial Process Screening Device – Teacher Form (APSD-T; Frick & Hare, 2001)—The APSD-T is a 20-item behavior rating scale that measures antisocial behavior in youth. The measure was completed by each child's main teacher at each assessment time point. Items on the APSD are scored from 0 (*not at all true*), 1 (*sometimes true*), to 2 (*definitely true*) and can be summed to yield a total score that can range from 0 to 40, with higher scores reflecting more antisocial behavior. Three factor scores (Frick, Bodin & Barry, 2000) measure narcissism (7 items), impulsivity (5 items), and callous–unemotional traits (6

items). In the current sample, alpha levels ranged from .91-.92 for the total score; .85 to .89 for the narcissism subscale; .75 to .80 for the impulsivity subscale; and .70 to .79 for the callous-unemotional subscale.

Data Analysis Strategy

Multilevel statistical models examine students' behavior changes over time by analyzing the longitudinal effects of the intervention conditions on behavior at multiple time points nested within students (Raudenbush & Bryk, 2002). Growth models were constructed to examine the longitudinal effects of intervention conditions while taking into account student-level variables (gender; ethnicity; screening level; repeated grade) and to potentially control variations between schools by using HLM 6.02 with the full maximum likelihood (FML) estimation method used to estimate missing data.

Students were screened from 8 schools. Initially, we performed a three-level linear growth model by nesting students within schools. However, the intraclass correlation coefficient (ICC), or percentage of variance between schools, was very low for all outcome variables, ranging from 0 to 0.04. We also considered the ICCs at the classroom levels, but these ICCs were also low (ranging from .01 to .07), and more importantly most of the 100 classrooms (across the 3 cohorts) had only one or two students in them, precluding the use of classroom as a nesting variable for many of the participants in this study. Based on this result, a two-level growth model was then used for this project. Because there are three intervention conditions in the study, we created two dummy variables, CP-B and CP, as the indicator of intervention conditions. For CP-B, 1 is for booster Coping Power intervention condition and 0 is for the control condition. For CP, 1 is for Coping Power intervention only condition and 0 is for the control condition.

The two-level simple linear growth model was:

Level 1 model:

$$Y_{ti} = \pi_{0i} + \pi_{1i} \text{Time}_{ti} + e_{ti}$$

The Level 1 model was referred as the within-person or intra-individual change model, which captured individual growth rates. The time variable was the only time-varying-variable included in the level 1 model in this study. In each of the intervention conditions, students were assessed on each of the outcomes at five time points, including baseline. For each outcome, the value of Y was a function of time plus random effect.

In the level 1 model, i indexes student, t indexes time points. We assumed that the errors e_{ti} were independent and normally distributed with mean of zero and common variance, σ_{00} . The time variable was the time interval elapsed since baseline for repeated measurements and was set to zero at baseline. The coefficient π_{0i} was interpreted as the initial status of student i . The coefficient π_{1i} was the time slope or the growth rate for person i over the study period.

The level 2 model:

$$\begin{aligned}\pi_{0i} &= \beta_{00} + \beta_{01}(BCP)_i + \beta_{02}(CP)_i + r_{0i} \\ \pi_{1i} &= \beta_{10} + \beta_{11}(BCP)_i + \beta_{12}(CP)_i + r_{1i}\end{aligned}$$

The level 2 model was referred as the between-person or inter-individual change model, which captured between-person variability in initial status and the growth rate. Each of the

outcome variables was used to predict the coefficients in the level 1 model. In the level 2 model, β_{00} was the estimate of the mean status at baseline, and β_{10} was the estimate of the mean growth rate of students' behavior outcomes, Y . r_{0i} and r_{1i} were the individual deviations for initial status and growth rate as random effect, with variances τ_{00} and τ_{11} , respectively, and with covariance τ_{01} .

The following was a full conditional model at level 2 for the HLM analysis.

$$\begin{aligned}\pi_{0i} &= \beta_{00} + \beta_{01}(BCP)_i + \beta_{02}(CP)_i + \beta_{03}(Gender)_i + \beta_{04}(Ethnicity)_i \\ &\quad + \beta_{05}(Repeated\ Grade)_i + \beta_{06}(Screener\ Level)_i + r_{0i} \\ \pi_{1i} &= \beta_{10} + \beta_{11}(BCP)_i + \beta_{12}(CP)_i + \beta_{13}(Gender)_i + \beta_{14}(Ethnicity)_i \\ &\quad + \beta_{15}(Repeated\ Grade)_i + \beta_{16}(Screener\ Level)_i + \beta_{17}(BCP * Gender)_i \\ &\quad + \beta_{18}(BCP * Ethnicity)_i + \beta_{19}(BCP * Repeated\ Grade)_i \\ &\quad + \beta_{120}(BCP * Screener\ Level)_i + \beta_{121}(CP * Gender)_i \\ &\quad + \beta_{122}(CP * Ethnicity)_i + \beta_{123}(CP * Repeated\ Grade)_i \\ &\quad + \beta_{124}(CP * Screener\ Level)_i + r_{1i}\end{aligned}$$

All of the level 2 variables were dichotomous; the variables were coded as Gender 1 = boy and 0 = girl, Ethnicity¹ 1 = African American and 0 = all others, Repeated Grade 1 = Yes and 0 = No, and Screener Level² 1 = High and 0 = Low. Consistent with our prior approach to testing whether the intervention was more effective with certain subgroups of the sample (e.g. Lochman & Wells, 2002b, 2003, 2004; Lochman et al., 2009), children's gender, ethnicity, screener level, and history of having repeated a grade were examined as potential moderators of intervention effects. Because these child characteristics have not emerged as consistent moderators of intervention effects in the prior studies, there were no a priori hypotheses about moderation effects. A backward elimination process was used, using deviance tests to compare pruned models to prior models. The models pruned through backward elimination were significantly different than earlier models for five of the outcomes (Chi-square statistics ranging from 10.2 to 10.9), and tended to be different for the sixth outcome for narcissism ($\chi^2 = 8.6, p < .08$). A student characteristic was kept in the intercept model when it predicted initial status at a significant or trend level ($p < .10$), and the student characteristic and an interaction term between a student characteristic and the intervention condition was kept in the growth rate model when the interaction predicted the growth rate at least at a trend level. The Intervention conditions' indicators were not dropped from the model regardless of their level of statistical significance. When the relative strengths of the parameter estimates of the intervention condition effects were compared, models with the intervention contrasts were significantly different than free parameter models.

¹To determine whether ethnicity effects might be determined by family socioeconomic status (SES; the Hollingshead Index), the relationship between SES and ethnicity was tested and found to be nonsignificant, $t(239) = 1.37$. To further explore whether ethnicity effects in the analyses were due to SES, the following models were re-calculated using SES instead of ethnicity, and the results were identical. As a result, we only include the ethnicity results.

²The Screener Score is a continuous measure, representing the 30% most aggressive children in their classrooms; a categorical Screen Score was created by using a median split of the samples' Screen scores, and was created to illustrate interaction effects if they emerged. Because Screener Level could have been examined as either a dichotomous or a continuous variable, the analyses were recalculated with Screener Level as a continuous variable. The results were essentially the same when Screener Level as a continuous variable. All significant main and interaction effects remained significant, except the race-by-BCP interaction effect on the APSD Impulsivity outcome became a trend; no additional significant findings emerged. Because of the nearly identical results, only the results with Screener Level as a continuous variable are reported in the following section.

Results

Table 1 provides the means and standard deviations for the child externalizing outcome measures by intervention condition at each of the five time points. To address missing data, the HLM analyses used FML to estimate model parameters. Attrition bias was tested by examining whether children's characteristics (gender; repeated a grade; racial status; initial aggression screening level; intervention status) differentiated attriters from non-attriters in logistic analyses. Gender (being a girl), and having repeated a grade predicted attrition at T2. Only two of the 25 tests of possible attrition bias were significant, indicating that the follow-up sample was relatively similar in terms of children's characteristics to the original sample, and that there was no systematic pattern of bias across time. The retention rates (indicating retention from the full sample at T1) for the CP-Booster condition (CP-B; 95%, 93%, 90%, 80% and 72%, from T1-T5, respectively), the CP condition (97%, 92%, 72%, 64% and 59%), and the Control condition (98%, 96%, 81%, 73%, and 68%) were significantly different at T3, $\chi^2(2) = 6.25, p < .05$, but were not significantly different at the earlier or later time points.

The six outcome variables were significantly related, with correlations ranging from .45 to .89 at T5. The measure of callous-unemotional traits was the measure least related to the other outcome variables (correlations ranging from .45 to .55). The reactive and proactive aggression variables had the highest intercorrelation (.89), and these aggression outcomes were also highly correlated with the externalizing behavior outcome (.85 and .87, respectively). Impulsivity (.69 to .79) and narcissism (.80 to .86) also had high correlations with externalizing and aggressive behaviors.

Table 2 summarizes the results of the six HLM analyses conducted on the six teacher-rated behavior outcomes³. This summary table includes the significant and trend effects that remained after the backward elimination of nonsignificant terms. Hypothesis 1 predicted that there would be significant main effects of the Coping Power intervention (without Booster) on the linear growth results for externalizing behavior across time. Findings in Table 2 support this hypothesis. Significantly greater decreases in the slopes of externalizing behavior, $t(236) = -2.10, p < .05$, occurred for children in the Coping Power condition relative to the remainder of the sample (control group and CP-B). Hypothesis 2 predicted that there would be significant main effects of the Coping Intervention (without Booster) on the linear growth results for four specific types of antisocial behavior across time. The findings reported in Table 2 support this hypothesis for all 4 of these outcomes. Children in the Coping Power condition had significantly greater negative slopes for proactive aggression, $t(236) = -2.01, p < .05$, reactive aggression, $t(237) = -2.14, p < .05$, impulsivity, $t(235) = -2.26, p < .05$, and callous-unemotional traits, $t(236) = -2.08, p < .05$ across time than did the remainder of the sample (control group and CP-B). While no hypothesis had been formulated about intervention effects on narcissism, no CP intervention effect on narcissism were found.

Hypothesis 3 predicted that the intervention effects would be augmented when children received a booster intervention. Wald tests indicate that CP produced significantly greater reduction in proactive aggression across time than did CP-B, $\chi^2(1) = 3.82, p < .05$; there were no other significant differences between the two intervention conditions. When the CP-B intervention effects were examined, children who had received Coping Power plus the

³Effect sizes were computed for the significant effects found in tests of Hypotheses 1 and 2. Within each of the six HLM analyses, effect sizes for changes in growth rates between conditions (CP vs control) were calculated as $d = \beta/(\tau)^{1/2}$ (Raudenbush & Xiao-Feng, 2001). Effect sizes for the Coping Power intervention effects were within a moderate range (Cohen, 1988), and were .68 for Externalizing Behavior, .74 for Proactive Aggression, .64 for Reactive Aggression, .84 for Impulsivity, and .41 for Callous-Unemotional Traits.

Booster had significantly greater negative slopes for externalizing behavior, $t(236) = -2.39$, $p < .05$, impulsivity, $t(235) = -2.92$, $p < .01$, and narcissism, $t(236) = -3.02$, $p < .01$, across time than did the control group. These CP-B intervention effects were significantly moderated by children's race as indicated in Table 2. In addition, a significant CP-B x Race effect emerged for proactive aggression as well, $t(236) = 2.09$, $p < .05$. Figure 1 indicates that the intercepts differ for African-American children versus children of other races, with the baseline intercepts on the behavioral problems being higher for African-American children than others. However, the slopes were similar for the different race groups, indicating that similar CP-B intervention effects were evident for the two sets of races for the externalizing behavior, proactive aggression, impulsivity and narcissism outcomes. There were no CP-B intervention effects on the reactive aggression and callous-unemotional traits outcomes.

Discussion

The results of this study indicate positive long-term (i.e., 3-year) effects on a range of teacher-rated child externalizing problem behaviors subsequent to the Coping Power intervention. These findings are especially notable given that teachers who provided outcome ratings at follow-up were blind to the children's earlier intervention status and were therefore able to provide objective, unbiased ratings. It is also notable that intervention effects were obtained with a briefer version of a previously evaluated evidence-based program. This is the first study to document longer-term follow-up effects on children's externalizing behavior problems of this briefer form of the targeted preventive intervention delivered during the preadolescent years. It is also significant to note that the intervention effects were not augmented by the inclusion of a booster component.

Booster Intervention Effects

Results indicated that the booster intervention, offered during the school year following implementation of the Coping Power program, did not serve to increase the intervention effects already obtained by the Coping Power program. The only significant difference obtained between the Coping Power (CP) and the Coping Power plus Booster (CP-B) conditions in the Wald tests in the HLM models indicated, in an unexpected way, that children in the CP-B condition did not display the significant decreases in proactive aggressive behavior displayed by children in the CP condition. On the other five outcome variables, there were no significant differences between conditions. In comparison with the other conditions, CP-B did have significant effects on children's externalizing behavior and impulsivity (as did the CP condition) and on children's narcissistic features (which the CP condition did not influence in direct intervention effects). The CP-B intervention effect was moderated by children's race, although both African-American children and children of other races appeared to respond to intervention in similarly positive ways. Secondary analyses indicated that the moderator effect of children's race was paralleled by how SES moderated intervention effects, suggesting that low income children and African-American children have more baseline behavior problems but benefit to intervention in a manner similar to children from other races and from higher income families.

Why is it that the booster intervention did not add to the intervention effects across time, and may have actually resulted in a reduction of the intervention effects on proactive aggression? There are a set of possible reasons involving the structure of this booster intervention and the way in which boosters function. First, the booster intervention that we used primarily involved monthly contact with the children, and rarely with the parents of the children. There are suggestive findings that booster interventions for externalizing problem children may be more effective if they are family-oriented (Tolan et al., 2009) or have a parent component (Lochman, 1992). The follow-up meetings with parents may have integral

effects in reminding parents about parenting skills they have learned, and especially about how to overcome barriers in implementing those skills. This process would be akin to providing performance feedback when training clinicians in the use of new evidence-based programs (e.g., Lochman et al., 2009). The parent component for Coping Power has been found to be integral for creating positive effects on delinquency and substance abuse outcomes (Lochman & Wells, 2004), even when parent attendance is limited, as evident in this study. Booster interventions that only focus on the child with externalizing problems may not have sufficient strength if there is no ongoing effort to reshape and maintain changes in the family environment around them.

There may also have been certain key limitations in the way in which our child-oriented booster was developed, limiting its impact on children. Thus, a second reason for the booster's lack of effects may be due to the structural format of the booster sessions. These sessions only occurred monthly and these brief contacts with the children did not involve new manualized skills for the children. Thus, the dosage of the booster may have been too limited. When the booster was planned, it was thought that providing brief periodic sessions would serve to help children sharpen their skills in using new social-cognitive skills that they had learned in the year previously. However, unlike the full Coping Power program, there was no behavioral component, with monitoring and reinforcement of behavioral goals. The change from the small group format of the abbreviated Coping Power program to an individual format may have not been preferred by the children, and may have limited its effects. The timing of the booster sessions may have also not been optimal. Rather than providing a booster in the year after the intervention, boosters provided in a more phasic way at key transitions, such as the transition to high school, may be more developmentally powerful. The brevity, limited frequency, timing of the sessions, and the lack of structured elements may have been disadvantages.

Third, at a broader level, the present findings might suggest that booster interventions immediately after intensive and lengthy evidence-based programs for children with externalizing problems may not be useful. The booster after a lengthy intervention might unwittingly promote children's dependency on external monitoring and reinforcement for their behavior, rather than relying on the changes in internal locus of control that have been found to mediate the effects of Coping Power (Lochman & Wells, 2002a). The current study, and a prior Coping Power study with a different sample (Lochman, Wells, Qu & Chen, in press), suggest that children can incorporate and internalize material from the Coping Power program in such a way that they can further improve their ability to inhibit impulsive and aggressive behavior in their peer environment at school in the years after the end of the intervention. Undoubtedly some children do need, and do respond well to, booster intervention after a program. The current results suggest that a more thoughtful and tailored approach to such boosters should occur. Thus, assessment systems should be used to determine who might need booster and who might not, anticipating that most children who have received Coping Power might not need a booster intervention, at least in the immediate period after the program. For most of the aggressive children, a clear ending of the intervention would have been warranted.

Long-term Effects of a Briefer Version of Coping Power

The current results indicate that Coping Power can have long-term effects on children's teacher-rated problem behaviors. As teacher ratings are not biased by knowledge of intervention condition in the follow-up years, these are important indicators of the long-term efficacy of the program, and replicate recent follow-up findings from another Coping Power sample. In that study, children's aggressive behavior and academic behavior problems (not staying on task; not completing assignments) declined across a three year follow-up for Coping Power children, according to teacher ratings, in comparison to control children

(Lochman, et al., in press). Long-term intervention effects were also evident in children's expectations that aggressive behavior would have good outcomes, and in increases in parental supportiveness with children (Lochman et al., in press). The current results are notable because they demonstrate that similar long-term positive effects on children's externalizing behavior in the school setting can be evident even when a briefer version of Coping Power is used.

A central structural barrier to the effective dissemination of an evidence-based program is that intervention can be perceived by participants and practitioners to be too demanding and too lengthy (Kazdin, Holland & Crowley, 1997). This is a particularly important concern for interventions dealing with children's aggressive behavior. To address the wide range of risk factors contributing to children's aggressive behavior, it has historically been argued that long intervention periods may be necessary to make sustained changes in children's otherwise stable aggressive behavior (Kazdin, 2000). However, parents' perceptions that services would take too much time and would be inconvenient are the most significant access barrier that has distinguished between children with unmet and met mental health needs (Forman et al., 2009). Lengthy interventions can also be a problem in the school context because they can be perceived to interfere with school policies and demands, and because the results may not be immediately observed at the end of the intervention. This is especially the case for preventive interventions that cross over more than one school year, such as the full-length Coping Power program. School personnel increasingly feel that school-based psychological interventions that take too much time can detract from the school's perceived fundamental academic purpose (Weist, 2005).

Given such demands, it is imperative to develop focused treatment interventions that are as brief and user-friendly as possible. The current findings indicate that a briefer version of Coping Power that has cut one-third of the child and parent sessions may be as effective as the full-length program. The effect sizes for outcome prevention effects for both the full program (Lochman & Wells, 2003, 2004) and the abbreviated program are within the moderate range. This briefer version could be implemented during one school year, or during a six-month period in a mental health agency. More broadly, this finding suggests that greater attention should be paid to all evidence-based interventions to determine what are feasible yet effective intervention lengths, with the goal of enhancing the dissemination of the programs.

Intervention Effects on a Range of Antisocial Constructs

An interesting aspect of the current findings is that robust intervention effects were found not only for teacher-rated externalizing behaviors, as interventions have found in the past (e.g., Lochman et al., in press), but also on stable personality traits and a subtype of aggression that has been predictive of later delinquency and substance use. The intervention led to longer-term decreases in children's proactive aggressive behaviors, as well as in their reactive aggressive behaviors. Prior research with the Coping Power program has found more apparent post-intervention effects on children's proactive aggression than on reactive aggression. The current results indicate that the intervention effects on children's proactive aggression, which is associated with later delinquency and substance use, have been maintained through the long-term follow-up. In addition, long-term intervention effects were also apparent for reactive aggressive behavior. Improvement across time in reactive aggression is likely related to children's demonstrated reductions in impulsivity. It is also important to note that the intervention had effects on children's callous-unemotional traits, an important component of psychopathy, and supports growing beliefs (e.g., Salekin, 2010) that these traits can respond to intervention efforts.

Limitations

The conclusions about the utility of booster interventions based on the results of this study are limited by the relatively limited scope and focus of this particular booster component. A more structured booster program that included a contextual emphasis on parent intervention (in a manner parallel to the focus of the parent component of the Coping Power program) may have provided greater indication of booster effects. In addition, there was increasing difficulty obtaining teacher assessments during the later follow-up years, and the related attrition in teacher reports was a limitation. The analyses used all available information in the dataset to estimate model parameters, thus avoiding problems with power, but higher retention would have been useful.

Summary

The current results indicate that an abbreviated form of the Coping Power program can have meaningful long-term effects on children's externalizing behavior, as has been found with the lengthier version of the program (Lochman, Wells, Qu & Chen, in press), and that these program effects extend to important aspects of severe antisocial behavior such as proactive aggression and callous-unemotional traits. These results suggest that briefer versions of lengthy evidence-based programs may have similar significant effects, and have very important implications for addressing some of the common barriers that interfere with the dissemination of these programs. The current results also demonstrated that child-oriented booster interventions for children with externalizing behavior problems did not add to the strength or maintenance of intervention effects, despite prevailing assumptions about the value of boosters. Further intervention research will need to carefully examine whether booster interventions that are more structured and family-oriented may have stronger effects, or whether it will be adequate to end intervention and permit the inherent internalization of intervention's active mechanisms to maintain effects, as was evident in the present study.

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References

- Barry TD, Barry CT, Deming AM, Lochman JE. Stability of psychopathic characteristics in childhood: The influence of social relationships. *Criminal Justice and Behavior*. 2008; 35:243–262.
- Beauchaine TP, Webster-Stratton C, Reid MJ. Mediators, moderators, and predictors of 1-year outcomes among children treated for early-onset conduct problems: A latent growth curve analysis. *Journal of Consulting and Clinical Psychology*. 2005; 73:371–388. [PubMed: 15982136]
- Clarke GN, Rohde P, Lewinsohn PM, Hops H, Seeley JR. Cognitive-behavioral treatment of adolescent depression: Efficacy of acute group treatment and booster sessions. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1999; 38:272–279. [PubMed: 10087688]
- Cohen, J. *Statistical power analysis for the social sciences*. 2. Hillsdale, New Jersey: Erlbaum; 1988.
- Conduct Problems Prevention Research Group. Unpublished manuscript. The University of Alabama; Effects of preventive intervention on young adult arrests and self-reported criminal offenses. under review-a
- Conduct Problems Prevention Research Group. Unpublished manuscript. Duke University; Impact of early intervention on externalizing psychopathology at age 25. under review-b
- Daunic AP, Smith SW, Brank EM, Penfield RD. Classroom-based cognitive-behavioral intervention to prevent aggression: Efficacy and social validity. *Journal of School Psychology*. 2009; 44:123–139.
- Dodge KA, Coie JD. Social-Information-Processing factors in reactive and proactive aggression in children's peer groups. *Journal of Personality and Social Psychology*. 1987; 53(6):1146–1158. [PubMed: 3694454]

- Dodge KA, Lochman JE, Harnish JD, Bates JE, Pettit GS. Reactive and proactive aggression in school children and psychiatrically impaired chronically assaultive youth. *Journal of Abnormal Psychology*. 1997; 106:37–51. [PubMed: 9103716]
- Eddy JM, Reid JR, Stoolmiller M, Fetrow RA. Outcomes during middle school for an elementary school-based preventive intervention for conduct problems: Follow-up results from a standardized trial. *Behavior Therapy*. 2003; 34:535–552.
- Eyberg SM, Edwards D, Boggs S, Foote R. Maintaining the treatment effects of parent training: The role of booster sessions and other maintenance strategies. *Clinical Psychology: Science and Practice*. 1998; 5:544–554.
- Eyberg SM, Nelson MM, Boggs SR. Evidence-based treatments for child and adolescent disruptive behavior disorders. *Journal of Clinical Child and Adolescent Psychology*. 2008; 37:213–235.
- Fite PJ, Colder CR, Lochman JE, Wells KC. The relation between childhood proactive and reactive aggression and substance use initiation. *Journal of Abnormal Child Psychology*. 2008; 36:261–271. [PubMed: 17823863]
- Forman SG, Olin SS, Hoagwood KE, Crowe M, Saka N. Evidence-based interventions in schools: Developers' views of implementation barriers and facilitators. *School Mental Health*. 2009; 1:26–36.
- Frick PJ, Bodin SD, Barry CT. Psychopathic traits and conduct problems in community and clinic-referred samples of children: Further development of the Psychopathy Screening Device. *Psychological Assessment*. 2000; 12:382–393. [PubMed: 11147105]
- Frick, PJ.; Hare, RD. *The Antisocial Process Screening Device (APSD)*. Toronto, Canada: Multi-Health Systems; 2001.
- Greenberg, MT.; Kusche, CA. Building social and emotional competence: The PATHS curriculum. In: Jimerson, SR.; Furlong, M., editors. *Handbook of school violence and school safety: From research to practice*. Mahwah, NJ: Lawrence Erlbaum Associates; 2006. p. 395-412.
- Harris, GT.; Rice, ME. Treatment of psychopathy: A review of empirical findings. In: Patrick, CJ., editor. *Handbook of psychopathy*. New York: Guilford Press; 2006. p. 555-572.
- Hawes DJ, Dadds MR. Stability and malleability of callous-unemotional traits during treatment for childhood conduct problems. *Journal of Clinical Child and Adolescent Psychology*. 2007; 36:347–355. [PubMed: 17658979]
- Hill LG, Lochman JE, Coie JD, Greenberg MT. Conduct Problems Prevention Research Group. Effectiveness of early screening for externalizing problems: Issues of screening accuracy and utility. *Journal of Consulting and Clinical Psychology*. 2004; 72:809–820. [PubMed: 15482039]
- Hodgins DC, Currie SR, Currie G, Fick GH. Randomized trial of brief motivational treatments for pathological gamblers: More is not necessarily better. *Journal of Consulting and Clinical Psychology*. 2009; 77:950–960. [PubMed: 19803574]
- Hutchings J, Bywater T, Daley D, Gardner F, Whitaker C, Jones K, Eames C, Edwards RT. Parenting intervention in Sure Start services for children at risk of developing conduct disorder: Pragmatic randomised trial. *British Medical Journal*. 2007; 334:678–685. [PubMed: 17350966]
- Ialongo NS, Werthamer L, Kellam SG, Brown CH, Wang S, Lin Y. Proximal impact of two first-grade preventive interventions on the early risk behaviors for later substance abuse, depression, and antisocial behavior. *American Journal of Community Psychology*. 1999; 27:599–641. [PubMed: 10676542]
- Kazdin AE. Developing a research agenda for child and adolescent psychotherapy. *Archives of General Psychiatry*. 2000; 57:829–835. [PubMed: 10986544]
- Kazdin AE, Holland L, Crowley M. Family experience of barriers to treatment and premature termination from child therapy. *Journal of Consulting and Clinical Psychology*. 1997; 65:453–463. [PubMed: 9170769]
- Kazdin AE, Siegal TC, Bass D. Cognitive problem-solving skills training and parent management training in the treatment of antisocial behavior in children. *Journal of Consulting and Clinical Psychology*. 1992; 60:733–747. [PubMed: 1401389]
- Kempes M, Matthys W, Maassen G, van Goozen SHM, van Engeland H. A parent questionnaire for distinguishing between reactive and proactive aggression in children. *European Child and Adolescent Psychiatry*. 2006; 13:38–45. [PubMed: 16514508]

- Kolko DJ, Dorn LD, Bukstein O, Pardini DA, Holden EA, Hart J. Community vs. clinic-based modular treatment of children with early-onset ODD or CD: A clinical trial with 3-year follow-up. *Journal of Abnormal Child Psychology*. 2009; 37:591–609. [PubMed: 19221871]
- Larson, J.; Lochman, JE. Helping school children cope with anger: A Cognitive-behavioral intervention. 2. New York: Guilford; 2010.
- Lochman JE. Cognitive-behavioral intervention with aggressive boys: Three year follow-up and preventive effects. *Journal of Consulting and Clinical Psychology*. 1992; 60:426–432. [PubMed: 1619096]
- Lochman, JE.; Boxmeyer, CL.; Powell, NP.; Barry, TD.; Pardini, DA. Anger Control Training for Aggressive Youth. In: Weisz, JR.; Kazdin, AR., editors. Evidence-based psychotherapies for children and adolescents. 2. New York: Guilford; 2010. p. 227-242.
- Lochman JE, Boxmeyer C, Powell N, Qu L, Wells K, Windle M. Dissemination of the Coping Power Program: Importance of Intensity of Counselor Training. *Journal of Consulting and Clinical Psychology*. 2009; 77:397–409. [PubMed: 19485582]
- Lochman JE, Boxmeyer CL, Powell NP, Qu L, Wells K, Windle M. Coping Power dissemination study: Intervention and special education effects on academic outcomes. *Behavioral Disorders*. 2012; 37:192–205.
- Lochman JE, Boxmeyer C, Powell N, Roth DL, Windle M. Masked intervention effects: Analytic methods addressing low dosage of intervention. *New Directions for Evaluation*. 2006; 110:19–32.
- Lochman JE, Bierman KL, Coie JD, Dodge KA, Greenberg MT, Lochman JE, McMahon RJ. The Conduct Problems Prevention Research Group. Screening of child behavior problems for prevention programs at school entry. *Journal of Consulting and Clinical Psychology*. 1995; 63:549–559. [PubMed: 7673532]
- Lochman JE, Wells KC. Contextual social-cognitive mediators and child outcome: A test of the theoretical model in the Coping Power Program. *Development and Psychopathology*. 2002a; 14:971–993.
- Lochman JE, Wells KC. The Coping Power Program at the middle school transition: Universal and indicated prevention effects. *Psychology of Addictive Behaviors*. 2002b; 16:S40–S54. [PubMed: 12502276]
- Lochman JE, Wells KC. Effectiveness study of Coping Power and classroom intervention with aggressive children: Outcomes at a one-year follow-up. *Behavior Therapy*. 2003; 34:493–515.
- Lochman JE, Wells KC. The Coping Power program for preadolescent aggressive boys and their parents: Outcome effects at the one-year follow-up. *Journal of Consulting and Clinical Psychology*. 2004; 72:571–578. [PubMed: 15301641]
- Lochman JE, Wells KC, Qu L, Chen L. Three Year Follow-up of Coping Power Intervention Effects: Evidence of Neighborhood Moderation? *Prevention Science*. in press.
- McDonald MR, Budd KS. “Booster shots” following didactic parent training: Effects of follow-up using graphic feedback and instructions. *Behavior Modification*. 1983; 7:211–223. [PubMed: 6236795]
- McDonald R, Dodson MC, Rosenfield D, Jouriles EN. Effects of a parenting intervention on features of psychopathy in children. *Journal of Abnormal Child Psychology*. 2011; 39:1013–1023. [PubMed: 21553346]
- Mowbray CT, Holter MC, Teague GB, Bybee D. Fidelity criteria: Development, measurement and evaluation. *American Journal of Evaluation*. 2003; 24:315–340.
- Pardini DA, Fite PJ. Symptoms of conduct disorder, oppositional defiant disorder, attention-deficit/hyperactivity disorder, and callous-unemotional traits as unique predictors of psychosocial maladjustment in boys: Advancing an evidence base for DSM-V. *Journal of the American Academy of Child & Adolescent Psychiatry*. 2010; 49:1134–1144. [PubMed: 20970701]
- Raudenbush, SW.; Bryk, AS. Hierarchical linear models: Applications and data base methods, Second Edition. Thousand Oaks, California: Sage; 2002.
- Raudenbush SW, Xiao-Feng L. Effects of study duration, frequency of observation, and sample size on power in studies of group differences in polynomial change. *Psychological Methods*. 2001; 6:387–401. [PubMed: 11778679]

- Reynolds, CR.; Kamphaus, KW. Behavioral assessment system for children. Circle Pines, MN: American Guidance Service; 1992.
- Salekin, RT. Treatment of child and adolescent psychopathy: Focusing on change. In: Salekin, RT.; Lynam, RD., editors. The handbook of child and adolescent psychopathy. New York: Guilford Press; 2010. p. 343-373.
- Spoth R, Redmond C, Shin C, Azevedo K. Brief family intervention effects on adolescent substance initiation: School-level growth curve analyses 6 years following baseline. *Journal of Consulting and Clinical Psychology*. 2004; 72:535–542. [PubMed: 15279537]
- Tolan PH, Gorman-Smith D, Henry D, Schoeny M. The benefits of booster interventions: Evidence from a family-focused prevention program. *Prevention Science*. 2009; 10:287–297. [PubMed: 19513845]
- Vitaro F, Brendgen M, Barker ED. Subtypes of aggressive behaviors: A developmental perspective. *International Journal of Behavioral Development*. 2006; 30:12–19.
- Vitaro F, Brendgen M, Tremblay RE. Preventive intervention: Assessing its effects on the trajectories of delinquency and testing for mediational processes. *Applied Developmental Science*. 2001; 5:201–213.
- Webster-Stratton C. Preventing conduct problems in Head Start children: Strengthening parenting competencies. *Journal of Consulting and Clinical Psychology*. 1998; 66:715–730. [PubMed: 9803690]
- Weist MD. Fulfilling the promise of school based mental health: Moving towards a public mental health promotion approach. *Journal of Abnormal Child Psychology*. 2005; 33:735–741. [PubMed: 16328748]
- Zonneville-Bender MJS, Matthys W, van de Wiel NMH, Lochman J. Preventive effects of treatment of DBD in middle childhood on substance use and delinquent behavior. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2007; 46:33–39. [PubMed: 17195727]

1a: BASC Externalizing Behavior Problems

1b: Proactive Aggression

1c: APSD Impulsivity

1d: APSD Narcissism

Figure 1.

Interactions of Children's Race and Coping Power Booster condition for Four Outcomes

Note: AA: African-American

Table 1

Mean and Standard Deviations of Teacher-Rated Behavioral Outcomes Across Time

Measure	Time 1			Time 2			Time 3			Time 4			Time 5		
	M	SD	N	M	SD	N	M	SD	N	M	SD	N	M	SD	N
Coping Power with Booster															
BASCExternalizing	34.1	18.9	57	35.8	19.3	56	33.9	21.3	54	30.0	20.5	48	31.5	19.2	43
Proactive	23.3	11.1	57	25.1	11.0	56	23.7	10.7	54	22.4	10.6	49	22.2	10.7	43
Aggression Reactive Aggression	29.7	11.7	57	31.1	12.7	56	28.4	12.0	54	25.2	10.9	49	26.3	11.2	43
APSD Impulsive	4.9	2.5	57	5.2	2.4	56	4.5	2.4	54	4.1	2.3	50	4.5	2.1	43
APSD Callous-	5.2	2.4	57	4.8	2.2	56	5.0	2.7	54	5.4	2.5	50	5.3	2.6	43
Unemotional APSD Narcissism	5.0	3.5	57	5.7	3.8	56	4.7	3.4	54	3.6	3.0	50	4.3	3.4	43
Coping Power															
BASC Externalizing	39.7	21.4	59	36.7	20.0	56	36.3	19.9	44	34.3	21.8	39	29.2	20.8	36
Proactive	28.0	11.8	59	28.7	12.5	56	25.3	12.1	44	25.7	13.2	39	21.7	11.6	36
Aggression Reactive Aggression	34.2	12.6	59	33.5	12.6	56	30.4	12.1	44	30.3	13.2	39	27.0	12.5	36
APSD Impulsive	5.2	2.2	58	5.3	2.2	55	5.0	2.4	44	4.7	2.6	38	4.4	2.4	36
APSD Callous-	6.2	2.3	58	6.1	2.5	55	5.8	2.3	44	6.2	2.9	38	5.6	2.9	36
Unemotional APSD Narcissism	5.6	3.3	58	5.6	3.8	55	5.6	3.5	44	5.2	3.6	38	4.5	3.6	36
Control															
BASC Externalizing	28.2	18.7	117	33.2	18.9	115	28.5	18.6	97	30.7	20.7	87	30.0	20.3	81
Proactive	22.9	11.5	117	24.3	11.6	115	21.1	9.6	97	23.3	11.6	87	21.8	10.4	79
Aggression Reactive Aggression	27.8	13.8	117	28.8	12.6	115	26.0	11.0	97	28.1	11.5	87	26.2	13.0	79
APSD Impulsive	4.1	2.4	116	4.3	2.1	115	4.0	2.2	97	4.6	2.4	87	4.5	2.3	81
APSD Callous-	5.2	2.7	116	5.2	2.7	115	5.0	2.5	97	6.0	2.5	87	5.2	2.5	81
Unemotional APSD Narcissism	4.3	3.5	116	4.6	3.5	115	3.9	3.3	97	4.4	3.8	87	4.3	3.3	81

Note: BASC: Behavior Assessment System for Children; APSD: Antisocial Process Screening Device

Table 2

Summary of 2-level Growth Curve Analyses on Growth Rate

Variable	Fixed Effect					Random Effect			
	Coef.	SE	T	df	P-value	Variance	χ^2	df	P-value
BASC Externalizing									
Linear growth rate	.32	.97	.33	236	.741	17.57	365.58	229	.000
CP-B Dummy(1=CP-B 0=other)	-4.38	1.84	-2.39	236	.018				
CP Dummy (1=CP 0=Other)	-2.43	1.16	-2.10	236	.036				
Race (1=AA 0=Others)	-.56	1.11	-.51	236	.613				
CP-B*Race	4.33	1.96	2.21	236	.028				
Proactive Aggression									
Linear growth rate	-.34	.55	-.62	236	.539	4.44	314.36	229	.000
CP-B Dummy(1=CP-B 0=other)	-1.63	1.00	-1.64	236	.102				
CP Dummy(1=CP 0=Other)	-1.32	.66	-2.01	236	.045				
Race (1=AA 0=Other)	-.06	.63	-.10	236	.924				
CP-B*Race	2.14	1.03	2.09	236	.038				
Reactive Aggression									
Linear growth rate	.55	.54	1.03	237	.305	5.60	330.76	230	.000
CP-B Dummy (1=CP-B 0=other)	-.57	.68	-.84	237	.401				
CP Dummy(1=CP 0=Other)	-1.50	.70	-2.14	237	.033				
Gender (1=male 0=Female)	-1.69	.59	-2.87	237	.005				
APSD Impulsivity									
Linear growth rate	.26	.13	2.07	235	.039	.14	309.42	228	.000
CP-B Dummy (1=CP-B 0=other)	-.58	.20	-2.92	235	.004				
CP Dummy(1=CP 0=Other)	-.28	.13	-2.26	235	.025				
Gender (1=male 0=Female)	-.24	.11	-2.24	235	.026				
Race (1=AA 0=Others)	-.01	.12	-.11	235	.911				
CP-B*Race	.41	.21	1.97	235	.049				
APSD Callous-Unemotional									

Variable	Fixed Effect					Random Effect				
	Coef.	SE	T	df	P-value	Level-2				Level-1
						Variance	χ^2	df	P-value	
Linear growth rate	.35	.12	2.92	236	.004	.27	339.83	229	.000	3.58
CP-B Dummy (1=CP-B 0=other)	.08	.15	.51	236	.609					
CP Dummy(1=CP 0=Other)	-.42	.20	-2.08	236	.039					
Gender (1=male 0=Female)	-.43	.14	-3.08	236	.003					
CP* Gender	.39	.23	1.71	236	.087					
APSD Narcissism										
Linear growth rate	.13	.17	.74	236	.458	.40	305.89	229	.001	7.30
CP-B Dummy (1=CP-B 0=other)	-.92	.31	-3.02	236	.003					
CP Dummy (1=CP 0=Other)	-.19	.20	-.93	236	.356					
Race (1=AA 0=Others)	-.29	.19	-1.50	236	.135					
CP-B*Race	.84	.31	2.71	236	.008					

Note: AA:African-American; CP:Coping Power; CP-B:Coping Power-Booster; BASC:Behavior Assessment System for Children; APSD:Antisocial Process Screening Device